



# Simmonds & Bristow

Established 1965 ACN 010 252 418 Pty Ltd

## Engineering Consultancy



**General Experience 2009**

WATER AND WASTE MANAGEMENT SOLUTIONS FOR • MINING • HOSPITALITY • COMMUNITIES • DEVELOPMENT  
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## 1. Why Choose Simmonds & Bristow?

By choosing Simmonds & Bristow for your engineering needs you can count on being serviced by highly-qualified, expert professionals. S&B also provides a one-stop-shop for water & environmental monitoring, laboratory analysis, consulting and industry training needs.

## 2. Engineering Consultancy Overview

Simmonds & Bristow's extensive experience with water and wastewater treatment plants has enabled the development of a full range of engineering services to meet the increasing demands of industry, government and remote communities.

Our internationally-experienced and highly-driven engineering consultancy team has successfully designed and commissioned a variety of treatment plants throughout Australia, including municipal water treatment plants, sewage treatment plants, trade waste treatment plants, reverse osmosis plants and pool treatment systems.

Our engineering team is expert in all facets of water and wastewater treatment, and works closely with our in-house scientific team to develop cost-effective solutions which utilise proven, state-of-the-art technology. S&B's engineering team also work as troubleshooting consultants to save our clients time and money whenever treatment plant problems and technical issues arise.

## 3. Engineering Services

- Treatment Plant Design (p.3)
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## 4. Customer Service

When you choose S&B, we will assign a single client manager to look after your company and its requirements. You will avoid wasting time by being transferred from person to person trying to find someone who knows about the work we do for you. In addition, a project manager from our engineering consultancy team will be nominated to manage your project and ensure outcomes are met.

Your client manager will have a thorough understanding of your project as well as knowledge of the status of all current jobs. Your client manager will maintain contact with you throughout the project to keep you informed of the project status, progress and any obstacles. When you have specific queries, your client manager will be your first point of contact, and will arrange for your engineering consultants to contact you directly as required.

## 5. Servicing Remote Communities & World Heritage Areas

Simmonds & Bristow's engineering consultants specialise in designing, operating and managing water and wastewater treatment systems in sensitive environments and World Heritage Areas including Qld's Great Barrier Reef, the islands of the Torres Strait, and the Tasmanian Highlands and Riverlands. For more information on our expertise at operating in these delicate environments please see p.8.

## Treatment Plant Design

Simmonds & Bristow's in-house engineering team offers complete treatment plant design services to our clients. Process designs are developed with the operator in mind, to ensure the plant is easy to operate and maintain.

### Water Treatment

- Simple direct filtration and disinfection systems
- Chemical dosing systems
- Reactivator clarifier/sand filtration plants
- DAFF plants
- Conventional chemical coagulation, clarification filtration plants
- Slow sand filter with algae toxin removal plants
- Fluoride removal plants
- Dechlorination Plants for aquaculture and drink water
- UV disinfection

### Sewage and Wastewater Treatment

- Simple lagoon systems that work and control algae
- Trickling filter plants
- Wetlands polishing lagoons
- Sludge dewatering units
- RBC with biological N removal plants
- Nutrient removal (N&P) plants
- Conventional Activated sludge plants
- Advanced Activated sludge plants
- MBR treatment plants
- DAF systems
- UV disinfection
- Water Reclamation plants, for industry, resorts and communities
- Effluent reuse – toilets, irrigation
- Saline wastewater treatment and land disposal system
- Land Disposal by irrigation (trees and fodder crops)
- Anaerobic and aerobic sludge digesters
- Biogas recovery plants for strong industrial waste, for use in cogeneration or heat plants, incorporating two stage anaerobic fermentation and biogas bioreactors, activated sludge and filtration plant polishing of effluents to produce organic fertiliser and industrial process water bi-products in addition to high quality methane fuel.



Wujal Wujal STP (QLD)



Sheffield STP (Tas)

We have developed a wide range of treatment plants for organisations including:

- **Sewage & Wastewater Treatment**
  - **Kentish Council (Tasmania):** Upgrade / Modification of Sheffield STP to achieve AMT Licence conditions.
  - **Erupt Island Community (Torres Strait):** Greenfield design of sewage treatment plant incorporating flow balancing , primary and secondary sedimentation, fixed film oxidation and nitrogen removal, chemical phosphorus removal and dual disinfection with ocean outfall.
  - **Wujal Wujal Community (QLD):** Greenfield design of sewage treatment plant, incorporating flow balancing , primary and secondary sedimentation, fixed film oxidation and nitrogen removal, chemical phosphorus removal and dual disinfection.
  - **Australian Federal Police Training Centre:** sewage treatment plant upgrade to enable biological nitrogen removal, advanced filtration and dual disinfection with effluent irrigation and non-potable reuse.
  - **Richmond Waste Grease Trap Processing Plant:** treatment plant upgrade to optimise treatment and reduce environmental permissions.
  - **Huon Valley Council (Tasmania):** Detailed design of Geeveston STP modifications to meet robust AMT compliance
  - **Murgon Leather Company** – detailed design & commissioning complex wastewater treatment system for removal of heavy metals, grease, organic and nitrogen pollutants including sustainable land disposal of saline effluents (50% seawater equivalent).
  - **P&O Resorts** – Heron Is Resort Seawater Sewage Treatment Plant detailed design & commissioning of an advanced activated sludge treatment plant with full nutrient removal and effluent disposal to land and reuse for toilet flushing.
- **Water Treatment**
  - **P&O Resorts** - Cradle Mt Lodge - Direct Filtration water treatment plant, incorporating coagulation, deep bed sand filters, calcite filter neutralisation, UV and chlorine disinfection
  - **Cherboug Community** – Reactivator Clarifier, sand filtration water plant, with alum and polymer coagulation flocculation and chlorine disinfection for colour, turbidity and algae toxin control – algae infested raw water supply.
  - **Palm Is Community** – Direct filtration water plant, incorporating slow sand filters and granulated activated carbon absorber for colour, turbidity and algal toxin control. Chlorine disinfection.
  - **Longreach Water Treatment Plant** – conventional alum/poly coagulation, sedimentation filtration plant, treating river water to NH&MRC drinking water standards.

### **Treatment Plant Optimisation & Validation Studies**

Treatment systems must be tested and studied to ensure they work according to plan, and once built, the system must be validated depending on the technologies used. Simmonds & Bristow have expertise in pilot studies, flocculation, coagulation, settlement, dissolved air flotation and filtration trials, chlorine breakpoint and decay testing, mixer systems, oxygen transfer alpha factor testing trials, and silt density index trials.

Recent key projects include:

- **Huon Valley Council (Tasmania) Sludge Management Plan:** the study included the treatment of sludge for all Council STP and proposed alternative solutions of dewatering and reuse of bioproducts process.
- **Mid-Coast Water (NSW):** pilot study and validation of proposed treatment plant process for pre-treatment optimisation of the Tea Gardens water treatment plant.
- **Western Corridor Recycled Water Project (QLD):** coagulation testing for phosphorus removal

## Treatment Plant Commissioning

When commissioning a plant prior to handover, we find and remedy many of the faults inherent in any new plant. Our comprehensive commissioning report gives our clients a detailed insight into the limitations of their new plant, while confirming its capability to achieve the desired performance. A Trainer/Operator can be present throughout the commissioning period to oversee all operations.

### **S&B Training Opportunities**

*Trainer / Operators can also complete practical training courses where required. S&B's experienced training unit works in conjunction with our engineering team to ensure local operators undergo extensive training relevant to their fields of work. Training outcomes offered by S&B's training unit include Cert II and III in Water Operations (NWP20107/ NWP20108).*

### **S&B Laboratory Analysis**

*Our commissioning teams use our NATA accredited laboratories for analysis of samples taken throughout the commissioning period to validate on-site and instrumentation water quality data.*

Our comprehensive commissioning programmes have been used by:

- **Queensland Nickel:** activated sludge sewage treatment plant
- **Erub Island Community** RBC sewage treatment plant
- **Wujal Wujal Community** RBC nutrient removal sewage treatment plant
- **Masig, Mabuag & Warraber Communities:** RBC nutrient removal sewage treatment plants (3x)

## Treatment Plant and Sewerage System Performance Evaluation and Audits

Part of the effective operation of any water or wastewater treatment plant is a regular performance evaluation or audit of the plant and its operators. This is increasingly important under the Environmental Protection Act, so that companies have documented proof that their plants are running efficiently and effectively.

Our audit programme is comprehensive and involves:

- Site visit for information gathering, including plant inspection, equipment performance and condition
- Collection and analysis of samples of the influent and effluent
- Statistical analysis of operator log sheets and historical laboratory data to evaluate plant performance
- Interpretation of results and comprehensive recommendations for plant and process improvements
- Early notification to operations personnel and management of problems.

Recent clients who have chosen S&B to audit their plants include:

- **Waratah Wynyard Council** (Tasmania) (STP Audit)
- **Kentish Council** (Tasmania) - (Sewer reticulation system evaluation)
- **Dalrymple Bay Coal Terminal** (STP Audit)
- **Amcors Beverage Cans** (Chemical Stores Audit)
- **Goro Nickel New Caledonia** (STP Audit)
- **Peak Downs Shire Council** (WTP & STP Audits for Tieri and Capella)
- **Moranbah North Coal Mine** (STP & WTP Audits)
- **ICC-ISU (Torres Strait)** – (13 Island communities Water & Sewerage scheme operational Audits on RO and direct filtration/DynaSand WTP and Lagoon/trickling filter STPs)
- **BMA Peak Downs Mine** – (5 STP Audits)
- **SIEM - New Caledonia** (Water Bottle factory Audit)

## Routine Operations & Servicing

Treatment plants require dedicated operations staff who are well trained in the particular processes on site. Many organisations find it easier to engage Simmonds & Bristow staff for routine operation and servicing for water and wastewater treatment plants of all sizes, rather than to source appropriately trained staff externally. We can recommend operation & servicing on either a full-time or part-time basis, depending on plant size and the specific requirements of the organisation.

We currently provide this service to organisations including:

- **Bradken Industrial steel foundry – Activated Sludge STP**
- **Aquatic Gardens Caravan Park**
- **Sheldon College – Activated Sludge STP**
- **Queensland Baptist Care Retirement Village – Activated Sludge STP**
- **Woorabinda Council Water and sewerage systems including membrane WTP and trickling filter STP**
- **Voyages Resorts – 8 Resorts Lizard Is FNQ to Cradle Mt Lodge TAS – WTP & STP operational management support**

## Operator Support & Troubleshooting Advice

All operators need professional assistance when problems arise. Our Help Line service allows operators in all areas to get immediate answers to operational queries relating to water and wastewater treatment. Our process engineers provide troubleshooting advice and support to the following clients:

- **Voyages Hotels & Resorts** (8 resorts)
- **Kentish Council** (Tasmania)
- **Huon Valley Council** (Tasmania)
- **Couran Point Resort**

## Project Management for Major Projects

Our highly-experienced engineering consultancy team can provide on-site project management for any major water infrastructure or treatment plant project, including:

- Managing the technical and financial aspects of multi million dollar projects
- Supervising on-going works and co-ordinating contractors
- Managing DA application and organising follow-up with local authorities
- Liaising and informing clients with regular, comprehensive reporting

Recent project management responsibility:

- **Huon Valley (Tasmania) Regional Water Scheme**
- **Port Hitchinbrook Resort STP**

## Hydraulic Modelling

Our engineers are experienced in reviewing and designing new reticulation systems based on most recent software (Bentley), with areas of expertise including pipe sizing, pump and tank capacities, chlorine residual analysis. Our most recent works on hydraulic modelling included:

- **Logan City Council** (QLD) - review of hydraulic design of Daisy hill sewer network and lower logan water supply network, for P&E Court development appeals.
- **Huon Valley Council** (Tasmania) - review of Regional Water Scheme hydraulic model.

## Engineers Certificates for Treatment Plants

Simmonds & Bristow's engineers can provide an engineering process design review and an Engineers Certificate for treatment plant design or fitness for purpose.

The Engineers Certificate includes a review and certification for the following:

- Flow rate ratings; effluent quality; inlet quality
- Process flow diagram with mass balance and water balance
- Detailed piping and instrumentation diagram
- Mechanical equipment schedule and technical specifications
- Instrument technical specifications

- Plant layout and arrangement drawings
- Unit process arrangements drawing
- Control logic diagram / specification
- Pump curves and duty points

The Engineering Certificate will certify that the process is fit for purpose, or meets design specification / intent, and that the plant will achieve process outputs (flow and water quality based on design details).

### **On-site Clean Water Testing**

During treatment plant commissioning, S&B can test and check process hydraulics and performance, as well as equipment and process units, to ensure that they meet with design specifications and construction/fabrication drawings.

Testing can include:

- Tracer testing of mixing zones to ensure mixers and baffles are correctly positioned and arranged to eliminate dead spots
- Hydraulic Tests & Measurements on all pumps, weirs, flow pipes and channels
- On-site clean-water aeration system standard oxygen uptake testing

Simmonds & Bristow holds NATA registration to perform oxygen transfer testing. We have extensive expertise of carrying out oxygen transfer testing in order to allow clients to meet pre-commissioning testing requirements for wastewater treatment plant upgrades and installations.

We undertake oxygen transfer testing in accordance with the ASCE "Standard for the Measurement of Oxygen Transfer in Clean Water", and issue a NATA certified report detailing the procedure and outcome of the testing.

- **Warwick Water Reclamation Plant:** Oxygen Transfer Testing (SOTR & SOTE) validation studies
- **EPCO** – Oxygen Transfer testing – Warraber, Masig, Mabuiag, Erupt STPs
- **Warman International** – Hat Head STP; Richmond STP
- **Rehau** – Watella digesters
- **Kentish Council** - Sheffield STP

### **Operation & Maintenance Manual**

A site-specific Operations & Maintenance Manual can be written to provide daily, weekly, monthly and annual log sheets for the comprehensive operation of the Treatment Plant. Manufacturers' maintenance information will be condensed into an easy-to-read format, which will enable the operators to perform much of the required maintenance on-site. The O&M Manual will be written in language which complements any delivered training, and takes into account the operators' level of understanding of the plant and treatment processes.

O&M manuals have been written by S&B for a variety of treatment plants including:

- **Wujal Wujal STP • Masig STP • Cradle Mountain WTP • Cradle Mountain STP**
- **Mabuiag STP • Warraber STP • Sheffield STP**

### **Commissioning Report**

A Commissioning Report can be written to validate the process and to document that all unit equipment is in compliance with the design specifications under normal operation with live sewage. This report includes an Engineers Certificate stating that the plant meets all requirements of the contract for consideration by the superintendent.

Clients who have recently used S&B's expertise to validate treatment plants include:

- **Wujal Wujal STP • Masig STP • Cradle Mountain Lodge STP • Mabuiag STP**

## Servicing Remote Communities & World Heritage Areas

Simmonds & Bristow's engineering consultants have extensive experience in the design, operation and management of small and remote water and wastewater treatment systems, particularly in sensitive environments, including World Heritage Areas of the Tasmanian Highlands & Riverlands, Qld's Great Barrier Reef, Lamington Plateau, Carnarvon Gorge, Daintree Wet Tropics and the islands of the Torres Strait.

S&B's extensive list of clients for environmental monitoring, process auditing, water & wastewater engineering design, training and management services in remote sensitive areas include:

- Cradle Mt Lodge • Binna Burra Lodge • Dunk Is Resort • Lizard Is resort • Heron Is Resort • Brampton Is Resort • Beddara Is Resort • Hamilton Is Resort • Lindemann Is Resort • Oasis Lodge • 15 Island Communities of the Torres Strait • 17 Qld aboriginal communities including Palm Is, Wujal Wujal & Woorabinda Councils • Voyages Resorts • P&O Resorts • Club Med Resorts
- National Parks (Tas) • Kentish Council (Tas) • Huon Valley Council (Tas)

S&B has provided expert engineering services to National Parks and Wildlife (Tas) to rectify problems with their sewage treatment plants at Cynthia Bay Lake St Clair National Park, Ben Lomond National Park (Ski Resort), Lake Barrington National Park (Rowing Championships), Waldhiem and Dove Lake STP systems and Coles Bay, as well as Qld National Parks at Carnarvon Gorge.

Our sewage treatment plant designs use the most appropriate technology for the site and application, ensuring that variability in inflow characteristics are managed effectively whilst still achieving a high quality effluent, in most cases meeting or exceeding Qld Class A recycled water standards with 80<sup>th</sup> percentile or better statistical compliance.

Examples of our experience and application of innovative designs in environmentally sensitive regions include:

**Torres Strait and Cape York Peninsular:** Nutrient removal RBC and upflow fixed media treatment plant design, construction and commission for operation by indigenous operators on Erub (Darnley Is), Masig (Yorke Is) and Wujal Wujal.

**Warraber and Mabuig (Torres Strait):** Commissioning of plants to deliver biological nitrogen removal and chemical phosphorus removal with little operator intervention under variable sewage loads. Sludge is digested on-site, while effluent is used on sports fields, in road making, dust suppression, and discharge to the region's fringe reefs and upper tidal areas.

**Tasmania & Papua New Guinea (Alpine regions):** Automated activated sludge treatment for resort and mining sewage to a Class A recycled water, with Alpine temperature ranges from -10 to 30 °C. Loads range from 5% of design capacity in winter to 110-150% in summer. Winter loadings involve artificial feeding with a mixture of dog food and sugar to maintain license compliance, with full nutrient removal (N&P) to GBRMPA equivalent open water limits.

**Great Barrier Reef Marine Park (coral cay):** An automated seawater STP producing Class A recycled water with full nutrient removal (N&P). Effluent disposal via indirect aquifer recharge. The plant has now been converted to a fresh water system after a decade of successful operation with effluents used for toilet flushing and lawn/garden irrigation in addition to indirect aquifer recharge.

**Daintree National Park:** An automated plant treating resort sewage to a Class A effluent standard with full nutrient removal for discharge to rainforest irrigation or the Mossman River. The rainforest irrigation system is established on slopes exceeding 20% and operates throughout the dry season with no runoff.

<ENDS>



**OTHER SERVICES OFFERED BY SIMMONDS & BRISTOW INCLUDE:**



**ENVIRONMENTAL SCIENCE**

ENVIRONMENTAL IMPACT & RISK ASSESSMENTS | ENVIRONMENTAL IMPACT STATEMENTS | EPA LICENSING | ENVIRONMENTAL MONITORING | OPERATIONAL HEALTH & SAFETY MONITORING | AIR QUALITY MONITORING | LAND & SOIL INVESTIGATIONS | WATER & WASTEWATER MONITORING & ASSESSMENTS



**TRAINING SERVICES**

CERTIFICATE II & III IN WATER OPERATIONS (NWP20107 & 30107) | DIPLOMA IN WATER OPERATIONS | SHORT COURSES IN WATER OR WASTEWATER TREATMENT PLANT OPERATION | SHORT COURSE IN ENVIRONMENTAL SAMPLING



**LABORATORY SERVICES**

CHEMISTRY | MICROBIOLOGY | DRINKING WATER | RAW WATER | WASTEWATER | RECYCLED WATER | AGGREGATES | SOILS | SLUDGES | ALGAE



VOYAGES HERON ISLAND GREAT BARRIER REEF



VOYAGES DUNK ISLAND GREAT BARRIER REEF

